



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Makoto OGISO et al.

Group Art Unit: 3747

Application No.: 10/628,497

Examiner: M. GIMIE

Filed: July 29, 2003

Docket No.: 116208

For: CONTROL APPARATUS AND METHOD FOR INTERNAL COMBUSTION ENGINE
HAVING VARIABLE VALVE SYSTEM

REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. §1.111

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In reply to the May 9, 2005 Office Action and the August 15, 2005 personal interview, the period for reply extended to September 9, 2005 by the attached one-month Petition for Extension of Time, reconsideration of the above-identified application is requested. Claims 1-13 are pending.

Applicants appreciate the courtesies shown to Applicants' representative by Examiner Gimie in the August 15, 2005 personal interview. Applicants' separate record of the substance of the interview is incorporated into the following remarks.

Claims 1-13 were rejected under 35 U.S.C. §103(a) over Robichaux et al. (Robichaux), U.S. Patent No. 6,513,493. The rejection is respectfully traversed.

Robichaux fails to disclose or suggest a control apparatus in which a controller is adapted to, during a first operation state where the amount of intake air is controlled through the control of the valve opening characteristic control, (a) control the degree of opening of the

throttle valve within a range of the degree of opening of the throttle valve that allows maintenance of an atmospheric pressure in the intake pipe under a condition that the valve opening characteristic (regarding an open state of an intake valve) is in a steady state at least during the first operation state, (b) while maintaining a continuity of the degree of opening of the throttle valve during a period of switch between the first operation state and a second operation state where the amount of intake air is controlled through the control of the degree of opening of the throttle valve only, as recited in claim 1 and as similarly recited in claim 11.

Robichaux fails to provide any disclosure with regard to controlling the amount of intake air by individually using either the intake valve or the throttle valve. Robichaux is concerned about controlling the amount of intake air using one or both of the intake valves, and not only the throttle valve.

Robichaux discloses a control strategy for an engine where transitions are made to various regions 30-36 (Fig. 2), wherein (1) in region 30, both a randomly operable intake valve 16 and a selectable intake valve 18 are employed, (2) in region 36, only the selectable intake valve 18 is employed and (3) in regions 32 and 34, only the randomly operable intake valve 16 is employed (col. 4, lines 18-28 and lines 62-63). When a transition is made from region 36 to regions 32 or 34 (where only the randomly operable intake valve 16 is employed), the intake valve timing of the randomly operable intake valve 16 is initially retarded while the throttle valve 14 is opened to maintain a substantially constant engine torque (col. 10, lines 19-39). The selectable intake valve 18 is eventually turned off when in regions 32 and 34 where only the randomly operable intake valve 16 is employed. When a transition is made from region 36 to region 30, the randomly operable intake valve 16 closing time is again initially retarded concurrent with the opening of the throttle valve 14 (col. 10, lines 40-56).

Robichaux thus fails to transition to a second operation state where the amount of intake air is controlled through the control of the degree of opening of the throttle valve only, as recited in claims 1 and 11, because Robichaux always controls the amount of intake air using either the randomly operable intake valve 16 or the selectable intake valve 18.

As discussed during the personal interview and as asserted on page 3 of the Office Action, the Examiner refers to col. 10, line 36 of Robichaux to assert that because the selectable intake valve 18 is turned off, Robichaux suggests that the intake air is controlled through the throttle valve 14 only. This suggestion is not correct because Robichaux explicitly discloses that the randomly operable intake valve 16 is also employed.

As discussed in col. 10, lines 19-39 of Robichaux, Robichaux performs a transition from region 2 (region 36 of Fig. 2) where only the selectable intake valve 18 is employed to region 1 (regions 32 and 34 of Fig. 2) where only the randomly operable intake valve 16 is employed. During the transition from region 2 to region 1, the randomly operable intake valve 16 closing time is retarded concurrently with the opening of the throttle valve 14 (block 216, col. 10, lines 31-34). After the randomly operable intake valve 16 closing time is retarded concurrently with the opening of the throttle valve 14, the selectable intake valve 18 may be turned off (block 218, col. 10, lines 36-37). The vehicle is thus operating in region 1 where only the randomly operable intake valve 16 is employed.

Robichaux does not suggest that the intake air is controlled by the throttle valve 14 only, because Robichaux explicitly states that the randomly operable intake valve 16 is employed. Robichaux fails to provide any disclosure or suggestion with regard to turning off the randomly operable intake valve 16 with the selectable intake valve 18. Robichaux also fails to disclose or suggest any region in which the vehicle operates when both of the valves 16, 18 are turned off.

Robichaux also fails to control the degree of opening of the throttle valve within a range of the degree of opening of the throttle valve that allows maintenance of an atmospheric pressure in the intake pipe while maintaining a continuity of the degree of opening of the throttle valve during a period of switch between operation states, as recited in claims 1 and 11. When Robichaux switches between regions, the randomly operable intake valve 16 closing time is initially retarded concurrent with the opening of the throttle valve 14. Because Robichaux only discloses opening the throttle valve 14 concurrent the retarding of the randomly operable intake valve 16, Robichaux fails to provide any disclosure or suggestion with regard to controlling the throttle valve 14 to maintain atmospheric pressure in the intake line 12. Robichaux fails to provide any disclosure or suggestion with regard to maintaining a degree of opening of the throttle valve 14 in order to maintain atmospheric pressure during a period of switching between operating states or regions.

In view of the foregoing, Robichaux fails to disclose all of the features recited in claims 1 and 11 as well as the additional features recited in claims 2 and 3.

Robichaux also fails to disclose a control apparatus, wherein a controller is further adapted to, if a switch between an intake amount control through the control of the degree of opening of the throttle valve and an intake amount control through the control of the valve opening characteristic (regarding an open state of an intake valve) is requested, cause the requested switch after an output of the internal combustion engine based on a currently performed intake amount control has reached a steady state, as recited in claim 4 and as similarly recited in claim 12.

As discussed above, Robichaux always controls the amount of intake air using either the randomly operable intake valve 16 or the selectable intake valve 18. Because Robichaux always uses an intake valve 16, 18, Robichaux fails to perform an intake amount control through the control of the degree of opening of the throttle valve 14. Robichaux fails to

provide any disclosure or suggestion with regard to performing a switch from an intake amount control through the control of the degree of opening of the throttle valve 14 after an output of the engine has reached a steady state.

Accordingly, Robichaux fails to disclose all of the features recited in claims 4 and 12 as well as the additional features recited in claims 5 and 6.

Robichaux also fails to disclose a control apparatus, wherein a controller is further adapted to control the valve opening characteristic so that an opening start timing of the intake valve and a closing timing of the exhaust valve become substantially symmetrical about a timing at which a combustion chamber capacity of the internal combustion engine becomes minimum at least during a predetermined operation state of the internal combustion engine, as recited in claim 7 and as similarly recited in claim 13.

Although Robichaux discloses exhaust valves 20, Robichaux fails to provide any disclosure or suggestion with controlling the timing of the exhaust valves 20. Accordingly, Robichaux fails to provide any disclosure with regard to controlling an opening start timing of the intake valves 16, 18 and the closing timing of the exhaust valves 20 such that they become substantially symmetrical.


Accordingly, Robichaux fails to disclose all of the features recited in claims 7 and 13 as well as the additional features recited in claims 8-10.

Withdrawal of the rejection is requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-13 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:SMS/sxb

Attachment:
Petition for Extension of Time

Date: August 26, 2005

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